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## The psychological network of breast cancer

Ivan Montes Nogueira<sup>1</sup> and Tania Romo-González<sup>2</sup>

<sup>1</sup>Instituto de Investigaciones Psicológicas, Universidad Veracruzana, México

<sup>2</sup>Instituto de Investigaciones Biológicas, Universidad Veracruzana, México

Breast Cancer (BC) is the disease that most affects women worldwide due to its high incidence and mortality rates. Breast cancer is a multifactorial disease, but the most studied factors are those related to a hormonal origin, environmental and genetic variables, obesity and lack of physical activity, and alcohol and tobacco consumption. On the other hand, the factors that are less studied on the etiology of BC are those of the psychological nature, however, it is well known that personality, emotions and stress has a great impact on genes, hormones, and lifestyle, that is, all those recognized risk factors. Recently, our research group identified the stress symptomatology as well as some psychological traits and tendencies that Mexican women had before their diagnosis of BC. The data show that these factors could be used for early diagnosis of BC, but the mechanisms through which these factors are launched into the psyche and influence disease development are unknown. Disease do not exists in isolation, in fact cancer contains many properties of networks at various levels of organization, including genetic, cell and phenotypic. Thus, psychological traits could also adopt network topography. To study the psychological network we measure the personality traits that have been associated with the predisposition to BC, such as emotional suppression and repression by the Courtauld Emotional Control Total Score (CECS) and the Weinberger Adjustment Inventory (WAI); and stress symptomatology with the Stress Symptoms Inventory (SSI). In this network the nodes represent the personality traits and their links the psychic pathways that are triggered by cancer. To show the dynamics of the evolution of the BC network we have included three groups of women, women with BC, with benign breast pathology (BBP) and without breast disease (H). In order to establish the presence of a Network among the 31 psychological variables (nodes) and evaluate whether the Networks are different among the groups of women (BC, BBP and H), Pearson correlations were calculated. Subsequently, if the Pearson Correlations obtained were statistically significant, they were plotted by UNICET 6 for Windows software. Statistical differences in the number of nodes and links between groups were calculated with the Kruskal-Wallis test. Our results shows that only the psychological traits explain the variance found between groups, that is, in this sample only the psychological traits increase the susceptibility to BC. In addition, the association of the network analysis with the principal component analysis also shows the process in which the disease occurs. The coherent psychological network in H had a sequential disconnection through BBP and to BC in two separate clusters, one that includes the nodes from PC1 (mostly stress symptoms) and the other that includes the nodes from PC2 (mostly emotional suppression). So it seems that breast pathology disconnect the emotions from the stress response and consequently its regulation, which predispose to breast cancer.

### Biography

Ivan Montes Nogueira is a doctoral student in psychology at the Universidad Veracruzana. He has a Bachelor's degree in Psychology and a Masters in Desarrollo Humano from the same university. In the professional field he worked in education, as Head of the educational orientation department and as a teacher at Instituto Tecnológico Superior de Misantla for seven years. At present he works at two universities in Xalapa, Ver. México, teaching undergraduate and graduate students. He is also therapist mostly on Carl Rogers' Person Centered Therapy and Logotherapy. Regarding on his field of research, his research is focus in health psychology specifically psiconeuroimmunology and psicooncology with two pending articles for publication.

ivanmontesnogueira@gmail.com

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